

Account

11. The catalyst structure of claim 10 wherein the steam reforming catalyst comprises a carbide selected from the group consisting of tungsten carbide, molybdenum carbide, and combinations thereof.

12. The catalyst structure of claim 10 wherein the steam reforming catalyst comprises Rh.

13. A steam reforming catalytic system comprising:

the catalyst of claim 10;

steam and hydrocarbon; and

hydrogen.

14. The catalyst structure of claim 10 wherein the spinel comprises Mg and Al.

15. A steam reforming catalyst structure comprising:

a support comprising a spinel support; and

a steam reforming catalyst selected from the group consisting of rhodium, iridium, nickel, palladium, platinum, carbide of group IVb and combinations thereof;

wherein the catalyst structure has stability such that, when tested in a packed bed at 900°C, with a feedstream consisting essentially of methane and steam at a 1:1 ratio of methane to steam, at a constant pressure and a contact time such that there is a hydrocarbon conversion of at least 50%, and measuring the CO selectivity, wherein between about 26 hours time-on-stream and about 40

2 cont.  
hours time-on-stream, the CO selectivity remains essentially unchanged and the hydrocarbon absolute conversion changes less than about 5%.

16. The catalyst structure of claim 15 wherein the steam reforming catalyst is selected from the group consisting of rhodium, iridium, nickel, palladium, and platinum.

17. The catalyst structure of claim 16 wherein the catalyst structure has stability such that, when tested in a packed bed at 900°C for 40 hours, at a steam to carbon ratio of 1:1 and a contact time of 25 msec, no coke deposition is revealed by electron microscopic examination.

18. The catalyst structure of claim 16 wherein the catalyst structure has stability such that, when tested in a packed bed at 900°C for 40 hours, at a steam to carbon ratio of 1:1 and a contact time of 25 msec, BET measurements detect no significant loss in surface area.

19. The catalyst structure of claim 16 made by:  
impregnating an alumina support with magnesia;  
calcining; and  
impregnating with a catalyst metal.

20. The catalyst structure of claim 16 further comprising a magnesia passivation layer disposed on the spinel.